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them, they would all reach India together. The *Periplus*, I may observe, takes no notice of iron or steel; from which we may conclude that both India and Egypt were well supplied with these metals, and had no need of each other's assistance. Neither is there any mention of copper, so that we are at loss to know how India was supplied with this metal, unless from its own mines.

XXII.—*On the supposed Infecundity of Human Hybrids or Crosses.* By JOHN CRAWFURD, Esq., F.R.S.

(Read June 21st, 1864.)

CONNECTED with hybridity, a theory has lately sprung up and chiefly obtained currency in France and America. This supposes that the mongrels resulting from the union of two different races of the human family ought to be sterile, as is the case with the progeny of two opposite species of the same genus of the lower animals; and to give an example, one of the advocates of the doctrine goes the length of asserting that the continuation of a race of mulattos is as impossible as the continuation of a race of mules. I am satisfied that this theory is without a shadow of foundation, and I shall devote this short paper to an exposure of the conspicuous fallacies on which it is founded.

The theory is, of course, not tenable in so far as concerns the races of Europe, since here we see the most mongrel nations not only equal to those the least mixed, but even in advance of them in strength, civilisation, and numbers: witness the French and the English, with their American descendants. But even when the races of man are the most widely different, no infertility can be traced in their mongrel descendants, and of this examples in abundance can be produced from every quarter of the globe; and I may here observe that the crosses themselves, wherever found, are wholly unconscious of the incapacity which the theory would ascribe to them.

In the countries lying on the African side of the Mediterranean, the native country of the ancient Numidians and Mauritanians—the modern Berbers and Kabyles—there has been a great intermixture of many races going on for at least 2,000 years. Italians, Greeks, Vandals, and above all Arabs, have mingled their blood with that of the aboriginal inhabitants; but no one pretends that the cross races are less fertile than the parent stocks from which they have sprung. The modern Turks assuredly are a very mongrel people. They arrived in Western Asia and Europe for the most part without their families, and since intermarried with

Syrians, Greeks, Georgians, and Circassians, and in so far as Europe is concerned, they are assuredly far more numerous now than when they permanently settled on it four centuries ago. Hybridity in this case has been assisted by bad government, but both together have not arrested the progress of multiplication. The present inhabitants of Egypt are eminently a bastard people, for in their veins run the bloods of ancient Egyptians, of Persians, of Greeks, of Romans, of Arabs, and of Turks. Yet with some ameliorations in administration, this very hybrid population has of late years very materially increased in number, whereas, were the theory I am exposing true, it ought long ago to have perished.

If we go to Asia we shall find many examples of mongrel populations which multiply just as fast as do the parent stocks from which they are derived. Two very distinct races of man exist in Persia in tolerably equal numbers. the Persian and the Turkish, and crosses between them are not unfrequent, yet no one alleges want of fecundity in such crosses. For a century back the blood of Anglo-Saxons, already much crossed, has been mixed with Hindu blood also crossed. The result is the Indian Eurasian, which fifty years ago might have been counted by hundreds, but must now be reckoned by tens of thousands. In the great island of Luzon, the principal one of the Philippine group, the native blood, which is Malayan, has been largely mingled both with Spanish and Chinese blood, and the mixed offspring of both connections is numerous. By the last census, that of 1849, the Chinese mestizos, known by the name of Sanglays, amounted to 60,000. To this number they had grown under heavy disabilities, and even persecutions of one of their progenitors, the Chinese, in the course of three centuries.

But America and its islands are the region in which the commixture of the races, and these too of the most opposite character, has been presented on the largest scale. Mexico is a good example. Out of a computed population of 8,000,000, a million only are of pure European blood, and 4,000,000 of pure Indian blood, leaving no fewer than 3,000,000 of mestizos, that is, of parties half European and half Red Indian. Thus we have a hybrid people which, instead of dying out, has, since the invasion of Cortez in the beginning of the sixteenth century, come to equal in number the populations of Holland, or of Denmark, or of Scotland. The majority of the present population of Hayti is understood to be a mixed one, consisting of the descendants of Caribs, Negroes, and Europeans. War, anarchy, and bad government have for the last half-century prevented that increase of population which ought to have taken place in a land so fertile and with so much room ; but they have not only not arrested it

altogether, or destroyed it wholly, for even some increase had taken place. In 1791, at its greatest prosperity as a slave colony of France, the number of the inhabitants of Hayti was computed at 700,000, and it is computed at present at 950,000; so that in about seventy years better than one-third had been added to the population. Jamaica is computed to contain at present about 400,000 inhabitants, one-tenth part of which number is held to consist of mulattos, or mongrels between the European and the African Negro. If this be so, a mixed population of 40,000 has grown up since the English conquest of the island under Cromwell, for the Spaniards, who made little account of Jamaica, can hardly be said to have settled in it.

Such facts as I have now stated are not to be gainsaid; and, therefore, the advocates of the new theory insist that fecundity in the hybrids is only kept up by occasional intermixtures of the parent stocks, in the absence of which inevitable sterility and the disappearance of the mongrels must follow. The argument is, of course, founded on the sterility of certain hybrids among the lower animals, which, although they will not breed *inter se*, will yet occasionally do so with one of the parents from which they are derived. It is insisted that an hybridity which would result in absolute sterility, and the consequent disappearance of the mixed race, should be perfectly equal as to the parentage. This is taking refuge in a case of which it would be difficult to find an example. A well-favoured mulatto girl will occasionally get an European husband, while an ill-favoured one will be obliged to content herself with a Negro one; but, for the most part, the unions which take place with mixed races are among themselves. But even allowing that the occasional intrusion of the blood of the original parents hindered an absolute sterility, terminating the existence of the mixed race, it ought at least to generate such an amount of infecundity as would make population either stationary or retrograde. No such result is known to take place. Mulattos will probably be found less prolific than Europeans in a cold climate, but more prolific in a warm one, the advantages and disadvantages of the parents in respect to climate being thus balanced.

M. Broca, the learned and ingenious Secretary of the Anthropological Society of Paris, a discreet supporter of the new doctrine, fancies he has discovered in the cross between the native Australian and European a hybrid destitute of fecundity and incapable of continuation. He appears to me to have come to this conclusion through a misunderstanding or a denegation of well-ascertained facts. The Australians are the ugliest and dirtiest of known savages, and it is not surprising that there should be a disinclination to any intercourse with them on the part even of

the most depraved of the European colonists. An union always casual and never amounting to a permanent connection has, however, occasionally taken place. When children are the result of such connections, they never receive the care of the fathers, but are left to that of the mothers, that is, return with them to the horde to undergo all the dangers and privations of the hunter's life. We need not, then, be surprised to find that the number of the cross-breed which survives this process is very small, and more especially when we reflect that the number of the natives themselves is undergoing a constant decadence. Besides this, the Australian men are known to have an antipathy to the cross-breeds, frequently destroying them, a fact testified to by all the intelligent colonists whom I have consulted on the subject, but which M. Broca only disposes of by an unreasoning denial.

But a chance not likely to occur again furnishes us with a fact which seems to me to set for ever at rest the allegation of infecundity in human hybrids. This is the history of the well-known mutineers of the ship *Bounty*. The mutiny took place in the year 1790, and the mutineers having first sailed to Tahiti, there taking on board some Tahitian men and women, finally settled on the small and unoccupied Pitcairn island. In 1793 the colony consisted of nine Englishmen, six Tahitian men, and thirteen Tahitian women. The Tahitian men were in time destroyed by the Englishmen, yet in 1814, when the little colony was discovered, its numbers had increased from twenty-two to forty-eight, that is, in twenty years' time, deducting the six Tahitian men, the population had more than doubled. In 1831 the numbers had risen to eighty-seven, and in 1853 to a hundred and seventy. Pitcairn island being found too small to support the colony, it was removed in 1862 to Norfolk island, and was then found to number two hundred and sixty-eight. In this long time, there has been no intrusion either of European or Polynesian blood, so that a hybrid population, consisting, as nearly as possible, of equal proportions of two very opposite races of man, has sprung up, their features and complexion telling the tale of their mixed parentage. This mixed race, then, instead of dying out as it ought to have done, if there were any truth in the new theory, has increased with a rapidity which has no parallel. The highest rate of increase in population on record is that of the Anglo-Saxon republic of America, which, with the help of a large immigration, has been multiplied tenfold in eighty years. In ten years less and without any immigration, the Pitcairn Islanders had increased their numbers better than twelvefold. This ought to be a satisfactory refutation of the figment of the infecundity of the hybrids of mankind, from whatever races sprung.

The theory thus refuted by undeniable facts had probably its

origin in the belief of its authors, that the races of man were analogous to those species of the lower animals, the union of which is followed in almost every case by a progeny which is sterile, as in the familiar example of the horse with the ass and of the common fowl with the pheasant. The affinity, however, between all the races of men is far closer than that between the species of the lower animals whose union is followed by a sterile progeny. Thus the period of gestation, the age of puberty, the limits of child-bearing, and the length of life are the same through all the races of mankind. With trifling exceptions, the result of climatic influences, their very diseases are the same, while none of them are common to any species of the lower animals. Even their intellectual powers are of the same nature, and differ only in degree. There is no such accord between those species of the lower animals whose union results in an unproductive offspring. The ass differs in form, in disposition, and in the nature of his food from the horse. The wolf that pairs with the dog to the production of a sterile offspring, is an untamable ferocious glutton. The jackal, that will do the same thing, is not only untamable, but differs even in its period of gestation.

We are not, however without examples, even among the lower animals, of species so closely allied that their offspring is fertile, as with the races of man. It is to be premised, however, that unions between such species never take place in the wild state, and occur only in the domesticated, that is, under the control and discipline of man. I take dogs, oxen, horses, sheep, and the llamas to be examples, for the crosses between the innumerable varieties of these are as fertile as their parents. Allowing every latitude to "sporting," or the production of varieties which belong to most of the domesticated animals (not to all, for the ass and camel sport very little, and the elephant, probably as long domesticated in the Hindu-Chinese countries as the ass in Syria, or the ox in Egypt, does not sport at all), it is impossible to believe that the vast variety now existing of horses, oxen, sheep, goats, and dogs, could have sprung from one single species. Some of these still exist in the wild state. There is a wild dog in India and one in Australia, very different from each other, but they pair freely with any domestic dog, and the progeny is fertile. There are four species of wild ox in India and its islands, and all of them will pair freely with the common domestic cattle, the progeny being indefinitely fertile. The yak of Thibet seems greatly to differ from other cattle, yet it is one of the four. The Asiatic buffalo is not, for its affinity with oxen is too remote, and it refuses to pair with any other kind of horned cattle. The llama and alpaca exist in the wild state as well as in the domestic. In the latter only these two distinct species will pair freely, and the offspring is as fertile as the parents.

The horse no longer exists in the wild state, but it is difficult to believe that any length of time should through mere "sporting" have produced the prodigious variety in size, form, colour, and disposition which now exists, and which seems to have existed from the earliest recorded time, a time when men were rude and paid no attention to the breeding that is the chief source of variety in authentic times. The horse existed from the remotest recorded times all the way from Spain to China; it existed in the greater islands of the Malayan Archipelago, and it existed in the islands of Japan, as unknown to the rest of the world down to the end of the fifteenth century as America itself. But it was wholly unknown in the great group of the Philippines, the principal island of which is thrice the size of Ireland, until introduced by the Spaniards in the sixteenth century; and it was wholly unknown in every part of the vast American continent and its islands until introduced by the same parties nearly at the same time. The conclusion seems to me inevitable that, considering the difficulties of communication in rude times, the horse of several distinct although closely allied species must have originally existed, at least as distinct as the wild dogs, wild oxen, and wild llamas which still exist.

It seems to have been a main object of the authors of the new theory to show that mankind is comprised of species like the genera of the lower animals, and in so far as the test of fertility of the offspring of two opposite parties is concerned, the term species, as we have just shown, is in a few cases applicable to man. It is not so, however, in the majority of cases, and it would, therefore, be convenient to have a word of more general application to express the distinctions which divide mankind, and which I have myself no doubt existed from his creation. I come to this to me inevitable conclusion, from considering that our knowledge points to no means exercised for any conceivable length of time, by which those broad and seemingly permanent types which now exist, and which as far as authentic history carries us, always have existed, could have been effected.

Language which would be correct as applied to the most perfect of the lower animals is not so when applied to man, a creature separated from the highest of them by a chasm, deep, broad, and incapable of being bridged. Let me for a moment glance at some of the most prominent qualities which distinguish him from the highest of the lower animals. The period of gestation with the ox is the same as with man, but the ox attains the age of puberty at a year old, while it takes a man fourteen years to reach it. The ox dies of old age about the time that man attains his full size and strength. The period of gestation with the elephant is by two-thirds longer than with man, and in bulk the elephant

is equal to thirty men, yet his length of life is but the same as that of man. The understanding of the elephant is wonderful, and yet it is not for a moment to be compared with that of the most grovelling savage of Australia. The season of love with the lower animals is periodical; with man it is almost illimitable. With the lower animals the love of offspring is confined to the brief period within which the care of the parent is indispensable to the safety of the life of the progeny. With man it extends through life,—prolonged even to the third and fourth generation.

Man is the only animal that has a pair of true hands, the only one that has the physical and mental capacity to fashion and to use a tool or a weapon. Through the cunning of his hand and his brain, man overpowers the lion and the tiger, and tames and reduces to slavery the dog, the horse, the camel,—even the elephant. The speech of the lower animals is confined to a few interjections, or at best to a single song. The lowest savages have a skilfully constructed language, the creation of untold ages, in which ideas are stored for present and future use. It would be superfluous to push further the contrast between man and the lower animals, but I think it must be evident that a creature so superlatively endowed as man cannot be classed and described in the same terms as dogs, oxen, and horses, or even apes however closely mimicking man.

XXIII.—*On the Prehistoric Cave-Dwellers of Southern France.*
By HENRY CHRISTY, F.S.A., F.L.S., etc.

(Read June 21st, 1864.)

MAN's existence upon earth is to be traced in almost all countries by the presence of one of his primitive industries,—implements of stone. I say one of his primitive industries, because it is very probable that the use of wood may, in many cases, have preceded that of stone, although, from its perishable nature, no very ancient examples in the way of proof have come down to us.

The term primitive may be fairly applied to these works, because we have broad ground for believing that the various races of men (though at widely different periods) have passed through what has been designated as the "Age of Stone," and the more so, because we have but one example, and that comparatively recent, in which man after he has attained to the use of metal, has returned to implements of stone.

These implements in stone are to be regarded as indicating a